

2. VERTIGO TANTILLA.

Pupa (Vertigo) tantilla, Gould, Proc. Bost. Soc. Nat. Hist. 1847, p. 197; Pfeiffer, Mon. Hel. iii. p. 557; (*Vertigo*) Mousson, Journ. de Couch. 1870, p. 127; (*Vertigo*) Schmeltz, Cat. Mus. Godeff. iv. p. 69; (*Pupinella*) Paetel, Cat. Couch. 1873, p. 108.

Vertigo tantilla, Gould, Expl. Exp., Shells, p. 92, fig. 103; (*Aiaca*) H. & A. Adams, Gen. Moll. ii. p. 172; Pease, Proc. Zool. Soc. 1871, pp. 460, 463, 474; Garrett, Journ. Phil. Acad. Nat. Sci. 1881, p. 400, 1885, p. 84.

Pupa pleurophora, Shuttleworth, Bern. Mittheil. 1852, p. 296; Pfeiffer, Mon. Hel. iii. p. 560.

Vertigo pleurophora, Pease, Proc. Zool. Soc. 1871, p. 474.

Pupa dunkeri, "Zeilebor," Pfeiffer, Mon. Hel. vi. p. 333.

Vertigo dunkeri, Pease, Proc. Zool. Soc. 1871, p. 474.

Vertigo armata, Pease, Proc. Zool. Soc. 1871, pp. 461, 474.

Pupa armata, Pfeiffer, Mon. Hel. viii. p. 407.

Vertigo dentifera, Pease, Proc. Zool. Soc. 1871, pp. 462, 474.

Pupa dentifera, Pfeiffer, Mon. Hel. viii. p. 408.

Ranges from the Society to the Viti Islands. This and the preceding species are found beneath rotten wood, under stones, and amongst decaying leaves.

In shape it varies from an abbreviate-ovate to oblong-oval, and also in a greater or less degree in the relative proportion of the whorls. Colour pale corneous under a brownish, more or less distinctly shagreened epidermis, which in perfect examples is furnished with oblique membranous riblets. The last whorl, behind the peristome, is frequently bisulcate.

March 1, 1887.

Prof. W. H. Flower, LL.D., F.R.S., President, in the Chair.

Prof. Jeffrey Bell read extracts from a communication sent him by Mr. Edgar Thurston, Superintendent of the Government Central Museum, Madras, with reference to a Batrachian of the genus *Cacopus*. Of a specimen of *C. globulosus*, Mr. Thurston wrote:—

"On laying open the visceral cavity, the globular shape was found to be due to an enormous distention of the œsophagus and stomach, the latter occupying nearly the whole of the abdominal cavity, and the remaining viscera &c. being compressed and lying posteriorly. There was no distention of the intestinal tract. The distention of the œsophagus and stomach was found, on section, to be caused by the presence in their cavities of a mass of winged White Ants (*Termites*), which, when dried, weighed 326 grains."

The colour of *C. systoma* during life was reported to be "primrose-yellow marbled with black, the yellow colouring-material rapidly dissolving in alcohol."



Mr. Salvin, on behalf of Mr. F. D. Godman, exhibited a pair of *Ornithoptera victoriae*, the male of which had been hitherto undescribed. These specimens had been obtained at the end of May 1886, by Mr. C. M. Woodford, at North-West Bay, Maleita Island, one of the Solomon group. The female had been known many years, having been described by the late G. R. Gray from a specimen obtained by John MacGillivray, but the locality where it was captured was not recorded. The hind wings of the female were more produced than is usual in this section of *Ornithoptera*; and this had led to the suggestion that *O. victoriae* might prove to be the female of *O. tithonus*, de Haan; but the description which follows this note shows that *O. tithonus* differs widely from *O. victoriae*, not only in colour but also in several remarkable points of structure. The cell of the primaries was very peculiarly formed, being very wide towards its distal end, the middle and upper discocellular nervures being very long; the lower discocellular was also long, but was ranged in line with the sections of the median as in true *Papilio*; the second and third sections of the median, especially the latter, were very short, so that the short median branches and the median itself beyond the cell lay very close together. The cell of the secondaries was very long and narrow, though normal in the female.

Mr. Salvin read the following description of the male insect:—

The wings are deep black; the primaries, except the costa, have a large patch of golden green, the outer margin of which is irregular and ill-defined and reaches to within a quarter of an inch of the end of the cell; towards the apex is a large subtriangular golden patch; parallel to the inner margin and near the anal angle is an elongated stigma similar to that of *O. priamus* and its allies. The secondaries, almost from the costal margin to beyond the cell, are rich golden green, the distal part of the cell being black, though the nervures closing it are green. There are also three contiguous submarginal golden-green spots, whereof the two nearest the anal angle have a large central patch of golden yellow. Beneath, the wings are shining golden green, with the nervures, margins, a large subtriangular patch over the end of the cell of the primaries, a series of submarginal spots at the end of each secondary nervure, and two lunate spots on either side of the lower radial of the primaries black.

The antennæ and prothorax are black; the abdomen ochraceous grey, with a double row of spots on either side and a ventral median line black.

The primaries are narrow, with hardly any perceptible anal angle, the outer and inner margins meeting in a continuous regular curve. The secondaries are elongated and narrow, and the inner margin deeply incised; the elongated hairs of the inner margin are pale yellow.

Mr. Godman also sent a specimen of a male *Ornithoptera tithonus* from the island of Waigiou for comparison; and it was at once obvious how very distinct this species and *O. victoriae* were.

Mr. Woodford, who captured these specimens, had made a large

collection of Butterflies in the Solomon and New Hebrides groups, the details of which it was hoped would be laid before the Society at a future meeting.

The following papers were read :—

1. The Experimental Proof of the Protective Value of Colour and Markings in Insects in reference to their Vertebrate Enemies. By E. B. POULTON, M.A., F.Z.S., F.L.S., of Jesus and Keble Colleges, Oxford, Lecturer on Zoology and Comparative Anatomy, St. Mary's Hospital, Paddington.

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Introductory.—In the preparation of a short course of lectures which were delivered at the Royal Institution in the spring of 1886, I had occasion to work up the historical aspects of my subject :—“The Nature and Protective Use of Colour in Caterpillars.” The results of this inquiry were thus expressed in the introductory part of the first lecture :—“When Darwin was investigating the bright colours of animals, and was elaborating his theory of their explanation as of use in courtship, he came across the brilliant colours of certain caterpillars and saw at once that they were a difficulty in the way of the theory. For caterpillars are undeveloped organisms ; they have been described as ‘embryos leading an independent life,’ and there is no way of distinguishing the sexes by external colour or structure (except in a very few instances). Therefore we here meet with brilliant colours, often rendering the possessors conspicuous, which cannot be of any use in courtship. Seeing therefore that the bright colours must be of use in some other way, Darwin drew the attention of Wallace to the subject, and asked whether he could suggest any explanation. Wallace accordingly thought over the subject, and considered it as part of the wider question of the varied uses (other than sexual) of brilliant and startling colour, in other stages of insect-life and in numerous instances scattered over the whole animal kingdom, and he finally ventured to predict that birds and other enemies would be found to refuse such conspicuous caterpillars if offered to them. He believed, in fact, that such larvæ are protected by possessing a nauseous taste or smell, and that it is to their advantage to become as conspicuous as possible, so that their enemies are warned against a repeated experience of the disagreeable results which follow from tasting them, that in fact the gaudy colouring acts as an indication of something unpleasant about its possessor. It was then pointed out that, as far as experiment had gone, it had entirely confirmed Wallace's prediction. Conversely Wallace argued that larvæ which were inconspicuous, being coloured